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would probably treat *basīṭ* as cognate to the Greek trimeter and inherited from PIE. Similarly, Classical Arabic *rajaz*, possibly the oldest of the Arabic meters, seems to have an Aeolic base in each metron, though the fact that this is not an Indo-European language would keep anyone from saying so:

rajaz (half-line)	|◡◡−|◡◡−|◡◡−|

It is tempting to compare this with the unregulated beginnings of the Vedic octosyllable and the glyconic above, where the *communis opinio* sees an inherited meter. Considerations like these should make us a little more skeptical to accept reconstructions of PIE meter at face value. Some of the features shared by Greek and Indo-Aryan meters might be areal (and so found in Arabic) rather than inherited. PIE speakers surely did have meter, but how much of it we can reconstruct is still an open area of research.

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Metrics (*métron*), Ancient Theories of

1. DEFINITION

Metrics (*metrikḕ epistḗmē/tékhnē*) is the part of rhythmics concerning verbal (as opposed to musical and orchestic) rhythm and its units, the meters (*métra*), i.e., recurrent patterns of long and short syllables considered as measures of rhythm. From the Classical until the Imperial age, scholars of metrics (*metrikoí*) devoted themselves to the study of → phonetics and → prosody and to the analysis of sung and recited verses as combinations of elementary units, the meters (see Plato's and Aristotle's passages quoted in §2; Aristox. *El. harm.* 41.9–12, 49.7–12 Da Rios; Arist. Quint. *Mus.* 1.23; see also Longin. *Prol. Heph.* p. 81.12–16 Consbruch for some differences in the choice of the starting point of a metrical treatise).

2. HISTORY

The beginnings of Greek metrics can be traced back to the middle of the Classical Age (it is unsafe to assume a theoretical discussion of rhythm in Lasus of Hermion's *On music*: Privitera 1965:44–46, 106ff. with n. 7; for dubious works of Democritus and Philolaus concerning rhythm see Budelmann 2001:210). Plato (*Crat.* 424c1–3) testifies that, in his time, those who were concerned with rhythms studied firstly the phonetic and prosodic qualities of the letters/sounds of the alphabet (*stoikheîa*; see also Aristot. *Poet.* 1456b31–34, *Part. anim.* 660a6–8), then the qualities of the syllables (see also Aristot. *Poet.* 1456b34–38) and finally the rhythms.

These topics are recorded in the same order among the interests of the sophist Hippias of Elis (test. 11 DK: Pl. *Hp. Mai.* 285c–d): he can therefore be defined as a *metrikós* (Gudeman 1934:343; Untersteiner 1954:52).

Damon of Oa was most likely a sophist (ca. 500–425 BCE), famous as musicologist, teacher and political adviser of Pericles (Wallace 1991; Giangiulio 2005; Rocconi 2008a, with further bibl.). As far as we can argue from Aristoph. *Nu.* 638–651 and Pl. *Resp.* 400b1-c5 (Koster 1944:161–165; Pretagostini 1979; Gentili 1988:6–9; Comotti 1991:98f.; West 1992:243f.), he partitioned the musical rhythm into *báseis*, viz. units formed by an upbeat (*ánō*: e.g. the raising of a foot or of a hand) and a downbeat (*kátō*: the opposite movement, marking time). The numerical ratio between upbeat and downbeat defined the kind of the rhythm: equal (1:1, i.e., –:◡◡ or ◡◡:–), double (1:2 or 2:1, i.e., ◡:– or –:◡) or hemiolian (2:3 or 3:2, i.e., ◡◡:◡◡◡ or ◡◡◡:◡◡). These were the only kinds or *genera* recognized as acceptable by theorists until Aristides Quintilianus (Aristot. *Rhet.* 1408b32–1409a6; Aristox. *Rhythm.* 30; Arist. Quint. *Mus.* 1.14). The *báseis* can be simple units, as the *dáktulos* (–◡◡), or composite, as the *enóplios súnthetos*, where simple *báseis* characterized by different kinds of rhythm are joined together (e.g. ◡–◡–◡◡––, which could be rhythmized as ◡–:◡– ◡◡:–– , i.e., as a sequence of one unit of equal kind and another of double kind). A particular form of rhythmical composition was considered the metrical one, based on the repetition of the same measure for several times: see the distinction between *métra*, i.e., trimeters and tetrameters, and *rhuthmoí* in Aristoph. *Nub.* 638ff. To put it in other words, meters were regarded as rhythms with a more regular and predictable cadence.

Besides, some importance was accorded by Damon also to the tempo (*tàs agōgàs toû podós*, Pl. *Resp.* 400c1, where *poús*, → foot, is synonymous to *básis*), as a musical factor able to make a difference to the effect of a particular *básis* (West 1992:153); this betrays a strong interest in musical performance and aesthetics (Halliwell 2002:132, 238–240 with further bibl.).

A remarkable aspect of the Damonic theory is the close relationship between orchestic, musical and poetic rhythm, as suggested by the use of the *básis*, the measured step of dance (cf. Pind. *Pyth.* 1.1–5), as the basic unit of all three components of the song's performance; the same

name *enóplios* recalls martial orchestic movements. The insistence upon performance is not surprising: in 5th c. Athens (and in the rest of Greece too) poetry was still an essentially performative art. What is striking is the gap between the composite practice presupposed by Damonic theory and that of contemporary composers, the so called New Dithyrambographers (notably Melanippides, Cinesias, Phrynis, Timotheus of Miletus, Philoxenus of Cythera). Their style was rich in melodic and rhythmic modulations (*metabolaí* and *kampaí*: West 1992:356; Hagel 2010:269ff.) and in ornamental division of notes (syllables sung on more than one note: see Aristoph. *Ran.* 1314, 1348; West 1992:201ff.); the full correspondence syllable-note(-step of dance) was so undermined in order to get a more expressive and mimetic music (a development whose beginnings can be traced back to the late 6th-early 5th c. BCE: Barker 2002:55–59).

3. Aristoxenus of Tarentum: the Birth of Rhythmics

The first theorist who recognized the change in musical practice and conceptualized the new relationship between musical and prosodic rhythm was the Peripatetic Aristoxenus of Tarentum (370/365 BCE-?). In his *Rhythmics*, originally in three books (Pearson 1990), he distinguished between rhythm, considered as an ordered arrangement (*táxis*) of upward and downward time-lenghts (*ánō khrónoi*, and *kátō khrónoi*) alternating, and 'rhythmizable' media (*rhuthmizómena*), whose parts can match the time-lenghts of rhythm. These media are speech, melody and dance, and their parts, respectively, syllables, notes and pauses: in one and the same composition, they can realize the same rhythmical pattern in different ways (e.g., to the prosodic sequence –◡◡ several possibilities may correspond on a musical level: ♩♪♪ or ♪♪♪♪ or ♩♩); furthermore, the same composition can be performed with different kinds of tempo (cf. Rocconi 2007). For this reason, a new basic unit of measure needed to be introduced, abstracted from the associations of any particular 'rhythmizable' medium and capable of assuming different durations: this is the primary time-lenght (*prôtos khrónos*), which can be defined as the minimal and indivisible duration corresponding to the smallest note, syllable or bodily signal occurring in a particular song's rendition (*rhuthmopoiía*:

cf. *Rhythm.* 2.11f., p. 8 Pearson). All the time-lenghts of a performance are therefore coinciding with one primary time-length or multiples of it (diseme —, triseme ⌣—, tetraseme ⌣⌣).

The different possibilities of renditions of the same rhythmical pattern do not modify its nature (*phúsis*), i.e., the arrangement of its parts (time-lenghts) and their reciprocal relationship or ratio (*Rhythm.* 2.19, p. 11 Person; see Gibson 2005:91ff.). Such a nature is made perceptible to the senses (*Rhythm.* 2.16, p. 10 Pearson) through small units, the feet (*pódes*), very similar to the Damonic *báseis*. Each foot is formed by at least one upbeat and one downbeat (⌣– and –⌣ are the shortest feet) and by no more than two upbeats and two down beats (e.g. ⌣–:–⌣ ⌣–:⌣–, ⌣–:⌣– –⌣:⌣–, ——:⌣⌣ –⌣: ⌣–) (*Rhythm.* 2.17–19, p. 10f. Pearson). Feet differ from each other in seven respects: lenght, genus (the only acceptable genera are those of equal, double and hemiolian ratio: see above §1), rationality or irrationality, composition (by *suzugía*, the conjunction of two dissimilar feet, or by *períodos*, the periodic association of three or more), internal division, arrangement of their parts, antithetical ratio between upbeat and downbeat (Arist. Quint. *Mus.* 1.13ff.; Pearson 1990:xxxiv–liv; Gibson 2005:77–98; Rocconi 2008b).

As a result of this theoretical approach, the three traditional constituents of the *mousikḗ* ('the art of the Muses') – poetry, melody and dance – are made autonomous study subjects within the main chapter of rhythmics; from now on, metrics (*hē metrikḗ*) establishes itself as an independent discipline concerning the syllables, their durations and their associations into *métra*, 'measures' (Aristox. *El. harm.* 41.9–12, 49.7–12 Da Rios; Arist. Quint. *Mus.* 1.23).

4. Hellenistic Theories of Rhythm

In the few remains of Aristoxenus' *Rhythmics* there is not a specific treatment of meter. However, it is possible to recognize an Aristoxenian approach to the topics in Arist. Quint. *Mus.* 1.15–17, where he describes the approach of the so-called *sumplékontes*, "those who combine such a study of rhythms [i.e., the Aristoxenian] with that of meter" (*Mus.* 1.18). These scholars analyze poetic diction (*léxis*) as a particular realization of rhythm. An example of their scholarship is the fragmentary treatise transmitted by *P.Oxy.* 9.2687 (1st/2nd c. CE: Rossi 1988). Here

several case of protraction of a syllable over its normal prosodic value in actual *rhythmopoiía* are taken into account; the uncomposite time-lenght subject to such a phaenomenon is called *monókhronon* (col. 2.25, 3.12f.; see also Mart. Cap. 9.982, p. 378.19ff. Willis). Alleged examples (probably from 4th c. BCE songs: Rossi 1988:13) concern five time foot (–⌣–) extended to six times (⌣–, ⌣⌣– and –⌣⌣), respectively in iambic, choriambic and trochaic contexts (Gentili & Lomiento 1995).

Opposite to this kind of analysis was that of the *khōrízontes*, those who considered rhythmics separately from metrics. Their approach was purely theoretical, numerical, and did not take into account perception of rhythms as Aristoxenus (and the Aristoxenians) did: "beginning from the diseme, they construct numbers as far as the composite rhythms and configure these in accord with the aforesaid ratios: equal (1:1), double (1:2), hemiolian (2:3) and epitriton (3:4!) […]. They make the composite rhythms in the following way: they set forth a number as a whole and partition this into rhythmic forms. And if these have some ratio the one to another which the *khrónoi* preserve from the simple rhythms, they declare that the form is rhythmic" (Arist. Quint. *Mus.* 1.18).

5. The Grammarians and the Philologists

While Hellenistic rhythmicians focused on musical rhythm, contemporary grammarians and philologists concentrated on the metrical pattern of poetic texts of the past, considered by then as pieces of literature (Pfeiffer 1968:102–104). Alexandrian scholars studied these texts in order to restore their original form, both linguistically and metrically, and to distinguish between authentic and spurious works of celebrated poets. Aristophanes of Byzantium (ca. 260–180 BCE; Montana 2006), particularly, devoted himself to lyric poems (included the lyric sections of drama), established their colometry, i.e., their division into metrical units (*kôla*), and restored metrical responsions between stanzas (fr. 380AB Slater). He was not the first doing so (Tessier 1995:22ff.; Barbantani 2009:301), but he was perhaps the first to do it systematically over a wide range of poems.

To which extent Alexandrian colometry followed the original musical design of lyric songs is a matter of much debate (see e.g. the opposite

positions of Prauscello 2006 and Lomiento 2008; Tessier 2011:11–18), most of all because the evidence for texts with musical notation is too scanty. In any way, the metrical units singled out by the Alexandrians in lyric poems – dimeters (*kôla* in the stricter sense), trimeters and tetrameters (*stíkhoi*: cf. Heph. p. 62.16ff. Consbruch with Lomiento 1995) – appear not to be new inventions, but the heirs of those recognized by ancient rhythmicians, dimeters corresponding to the longest feet admitted by Aristoxenus (e.g. ⏑⏑––⏑⏑–, ⏑⏑–⏑–⏑⏑–, ––⏑⏑–⏑⏑–; consider also the *enóplios súnthetos*, cited by Damon *ap.* Pl. *Resp.* 400b1-c5, and the glyconic ⏑⏑––⏑⏑–⏑–, referred to as a foot by Aristoph. *Ra.* 1323f.), trimeters and tetrameters corresponding to Damonic *métra* (see §2). The main difference is in the nature of such units: they are no more combinations of upward and downward time-lenghts, but combinations of long and short syllables.

The teachings underlaying colometrical divisions are systematically explained in the *Encheirídion* ('Little handbook') of the Alexandrian grammarian Hephaestion (2nd c. CE; van Ophuijsen 1987:3–6; Ippolito 2006a), the epitome of a work originally consisting in 48 books, gradually reduced by the author himself to 11, then to three and finally to one book (Choerob. *Prol. Heph.* p. 181.11–16 Consbruch), for didactic purposes (Longin. *Prol. Heph.* p. 86.1–5 Consbruch; cf. van Ophuijsen 1987:11ff.). The core of the handbook is the description of 9 fundamental *métra*, i.e., nine classes of syllabic patterns of which all verses are constituted: the iambic (based on the recurrence of the unit ⏑–⏑–), the trochaic (–⏑–⏑), the dactylic (–⏑⏑), the anapaestic (⏑⏑–⏑⏑–), the choriambic (–⏑⏑–), the antispastic (⏑––⏑), the ionic *a maiore* (––⏑⏑), the ionic *a minore* (⏑⏑––), the paeonic (–⏑⏑⏑, ⏑–⏑⏑, ⏑⏑–⏑, ⏑⏑⏑–, with the variant forms –⏑–, ⏑––). The term *métron*, refers both to each class of patterns and to its basic unit, the foot: simple foot, in the case of dactyl, double foot (*dipodía*, or *suzugía*) in the other cases. In many other instances, however, the word is used by Hephaestion with reference to a line or *stíkhos* (cf. e.g. p. 14.15–17.22 Consbruch), a meaning well attested from Classical age (see §1). On these different uses see Longin. *Prol. Heph.* p. 84f. Consbruch (van Ophuijsen 1987:16ff.).

The 9 fundamental classes are said by Hephaestion to be partly *monoeidê métra*, i.e., constituted by basic units (foot or double foot) of the same species, partly *homoioeidê métra*, i.e., formed by basic units of several but similar species. An iambic trimeter or a trochaic tetrameter are *monoeidê métra*, while sequences like ⏑––⏑– ⏑⏑– (choriambic dimeter) or ⏑–⏑–⏑–– (ionic dimeter with anaclasis) are *homoioeidê métra*. The process of blending units of similar species within a single metrical sequence is named *epiplokḗ* ('plaiting together; connection') and is grounded on the concept of *sungéneia* ('kinship'): only 'cognate' units can form a harmonious combination (the main connections by kinship are: 1. between iambus and trochaeus; 2. between dactyl and anapaest; 3. among choriambus, antispastic and ionics; no less productive are the connections between choriambus/antispastic and diiambus, and between ionics and ditrochaeus: Heph. fr. 2 Consbruch). Such a kinship between basic units reveals itself in three procedures by which it is possible to get a unit from another: *apharesis* (detraction), *prósthesis* (addition), and *metáthesis* (transposition). Some examples taken from Heph. fr. 2 Consbruch: if the first syllable is detracted from *mênin áeide theá* (–⏑⏑–⏑⏑–), an anapaestic meter or dipody is obtained (⏑⏑–⏑⏑–), while if the order of the internal syllables of an ionic *a maiore* is inverted the result is a ditrochaeus (––⏑⏑ > –⏑–⏑). All the combinations which do not follow the kinship's criterion are said to be *kat' antipátheian* ('by contrast'), such as the association of a choriambus with a trochaic meter (e.g. in the Sapphic hendecasyllable: –⏑–⏔, –⏑⏑–, ⏑–⏒) or that of a ionic with an iambic meter (e.g. in the Alcaic hendecasyllable: ⏒–⏑–, x–⏑⏑, –⏑⏒) (Heph. pp. 43–46 Consbruch).

The above expounded teachings, generally known as theory of the fundamental meters (*prōtótupa métra*: cf. Arist. Quint. *Mus.* 1.27), go back to the Hellenistic age: before Hephaestion, Philoxenus (1st c. BCE: Wendel 1941; Razzetti 2003, with bibl.) and Heliodorus (1st c. CE: Hense 1912; Rocconi 2004, with bibl.) were concerned with them: the first one, probably author of a treatise on meter (cf. Longin. *Proll. Heph.* p. 81.12f. Consbruch; *Suda* φ 394 Adler), considered the proceleusmatic, ⏑⏑⏑⏑, as the tenth fundamental *metron* (Apthon. *GL* 6.98.21f.); the other, famous for his edition of Aristophanes provided with a colometrical commentary, was author of an *Encheiridion* (Choerob. *Proll. Heph.* p. 181.9f. Consbruch) which began with the definitions of the fundamental meters (Longin. *Proll. Heph.* p. 81.13f. Consbruch), taken to be eight (with the exclusion of the paeonic: Apthon. *GL* 6.98.21f. + Choerob. *Heph.* p. 247.11–17 Consbruch). The

theory had a large following in the Greek world throughout the Imperial and the Byzantine age: suffice it to mention the anonymous treatises *P.Oxy.* 2.220 (1st/2nd c. CE: see now Morelli 2011:170ff. n. 20, with bibl.) and *P.Oxy.* 53.3707 (2nd c. CE), Aristides Quintilianus' *On music*, relying mainly on Hephaestion in 1.20–29 (Mathiesen 1983:26 n. 131; van Ophuijsen 1987), and the metrical studies of Isaac Tzetzes and Demetrius Triclinius (Tessier 2003–2004).

6. The Roman Doctrine

In the Roman world, the theory of *prōtótupa métra* was known thanks to Iubas (end of 2nd c. CE: Ippolito 2006b), who divulged Heliodorus' doctrines through his own metrical *Ars* (Mar. Victorin. *GL* 6.94.6–11). But another theory was more successful among Romans: that of *metra derivata* (*parágōga*), according to which all metrical structures can be described in terms of derivation from the dactylic hexameter and the iambic trimeter through the addition (*adiectio*) or the subtraction (*detractio*) of one or more syllables, and through the transposition (*permutatio*) or the combination (*concinnatio*) of parts of hexameter and trimeter (Caes. Bass. *GL* 6.271.5–22, Aphthon. *GL* 6.141.5–9).

The chief representatives of this doctrine are all Roman: M. Terentius Varro (for an overview of his fragments of metrical concern see Della Corte 1963, who however is skeptical about the *communis opinio* of Varro's adhesion to the *Derivationslehre; contra* Pretagostini 1993:378 n. 35; Morelli 2011:165–168), Caesius Bassus, author of an influential *Ars de metris*, the main source of Terentianus Maurus' *De metris* (Cignolo 2002:xliv). Far from being Varro's invention, the theory goes back to the Greek Hellenistic world: the collection of polymetric epigrams preserved as *AP* XIII, with its metrical lemmata displaying a derivative interpretation, can be assigned to the 2nd c. BCE (Morelli 1972:49–53; 1985). This is the first extant witness. It seems unsafe to trace this speculation back to Heraclides of Pontus on the basis of his assertion (fr. 158 Wehrli) that both the hexameter and the trimeter derived from the triple Apollinean invocation *iè paián*, which can be interpreted either as dispondiac, –––––, or as diiambic, ⏑–⏑– (assuming *correptio in hiatu*): there is no explicit reference to the derivation of all other verses from the two cited (Heinze 1918:2 n. 2; von Wilamowitz-Möllendorff 1921:68; Gottschalk 1980:134; Pretagostini

1993:379). No less unsafe is the hypothesis (Leo 1889) that the theory could be born in 2nd c. CE Pergamum, in connection with rhetorical studies and in opposition to the Alexandrian theory of the *prōtótupa métra* (Heinze 1918:11ff.; Leonhardt 1989; Morelli 1996:58ff.). More recently, the *derivatio metrorum* has been connected with the activity of Alexandrian grammarians (Leonhardt 1989), particularly with the ecdotic work on Archilochus' poems, ordered according to a metrical criterion (Morelli 1996:58ff.).

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MARCO ERCOLES

Metron

1. Metron in Stichic Meter

The basic meaning of *métron* is 'instrument for measuring' or 'measure'. It is used to denote a standard, a criterion or a rule, whereby order is created or established in several areas including cosmology, mathematics, and poetic meter. Order is considered aesthetically pleasing, a fact that can account for the use of the term *metron* in conjunction with poetry (Paul 1988:297). In the context of → metrics, *metron* primarily refers to a unit which is repeated, a meaning that is close to the instrument notion. The unit is of a higher order than → moras and → syllables, minimally the size of a → foot, maximally the size of a pair of feet. The repeated metron naturally occurs in stichic meter, and such verse is often referred to as metron-based verse (*katà métron*) in the Greek tradition. The metron is repeated in identical or equivalent shapes, given the legitimate variations in certain positions (West 1982:6).

To denote the length of a line of poetry, a figure denoting the number is added to the recurring unit, yielding the meter. Hence we have *dimeter, trimeter, tetrameter, pentameter, hexameter, heptameter*, and *octometer* to denote lines of two to eight metra. The term 'metron' is related to *meter*, and is used primarily with stichic verse. In Greek, the metron never constitutes a line by itself.

The most common metra used in stichic meter of the Classical Greek tradition are listed below. Boundaries between (verse) feet are marked with a dot. The traditionally assumed basic shapes are given to the left, and actual shapes – sometimes going beyond what are taken to be the canonical shapes – are given to the right.